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THE
LAW AND THE LOVE OF UNITY,
EXHIBITED IN CREATION.

A LECTURE

DELIVERED BEFORE THE

Halifax Young Men's Christian Association,

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BY

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LECTURE.

THE subject of to-night's lecture is the law and the love of unity. Unity I shall endeavour to exhibit as pervading all nature, as the law of creation. I shall show, that from simple, almost insipid, sameness nature advances into and evolves infinite variety and diversity, yet never loses her unity. Nay, that she produces by her very increase of variety, by her very diversity, only more remarkable, more pre-eminent unity. And, though I may not put the question, I hope you shall ask yourselves,—Can the God of creation who loves novelty, but gathers it into unity; who delights in varying his works, but only to bind them up together in the bonds of a most rhythmical harmony; can he be other than a lover of unity; can he be other than unity himself; and ought not we likewise to love the same; and the whole human family should it not be at one—at one with itself, at one with the universe, at one with God? The time shall come—may it come soon—when no such question shall be asked or needed in the happy family and united kingdom of **Paradise Restored**.

But without further preface I would commence my subject; and let us start from the beginning of all things. What was in the beginning? I will tell you what was not. You were not, I was not, this earth was not, matter was not—the matter that is in yon glorious host of stars—nor was the spirit, that is in the multitudes of man and angel. There are those who can remember when we began to be; and there are wise men who can send their thoughts back into the past eternity, and approach and discern, though still from afar, the childhood of matter. All had a beginning, and they could not have had a beginning without a cause. This is the teaching of experience, the dictum of reason, and the intuitive belief of the soul, that whatever began to be was caused. From one cause we may ascend to another higher than our last, but we must at length arrive at a highest—a first, an uncreated, self-existent, eternal, everlasting cause: nor can that be any form of matter. For matter

cannot think: but all creation, the universe, shows design; and before the thing designed there must be the intelligent cause to design; before the designed universe there must have been, there was, the intelligent designing God. Intelligent will is the only cause of all effects. God was in the beginning, and God alone. Out of nothing he created all things. Out of nothing did I say? Nay, I mistake. God spake the words, and heaven came out of his words; his will was that heaven should be, and heaven was. That will, those words of God were prolific parents. Their children let us fondly fancy were first of all—beings that could comprehend him—a shining throng of cherub, cherubim; seraph, seraphim; angel, archangel; a countless company of holy creatures rejoicing in the intelligent and voluntary being derived from the fiat of Divinity. But He, the Creator, spake again—again—again—and the fruit of his words, the children of his will, are not this lately made world and its creatures alone, but all the myriads of suns and worlds and universes that glitter over the infinitude of space, and perhaps have divided into epochs, which we may yet in the coming eternity count, the innumerable ages that have gone down into the unfathomable past. What a contrast have we here between the sameness, the insipidity of utter vacuity, the absence of all forms and conditions of matter, and the sight which made the sons of God clap their hands and shout together and sing for joy, when, behold! God had created space, and peopled every rood of the amplitude of heaven with a wilderness of worlds.

But though I might make this leap from the bosom of nothingness into the arms of advanced and comparatively perfected creation, since a thousand years are in the sight of God, and perhaps all pure spirits, but as yesterday, a tale that is told, nevertheless my purpose will be better served by exhibiting nature, as she actually appears to man, step by step slowly advancing to her present rounded development.

On piercing the crust of this earth a short descent brings us to intense heat, and the further the descent the greater the heat, until after a very few miles, philosophers are agreed in believing, that we must come to a nucleus of agitation and chaos—an abyss of fire. This is the cause of those earthquakes, which “with one last clang of bells for their own ruin strew cities flat, as riddled ashes, silent, as the grave;” the cause of those volcanoes too, which at intervals startle the world with deluges of fire. Now on the ladder, so to speak, of Geology we can ascend through the past

to the time when the crust of this earth was not even a few miles in thickness, but thin as the ice upon the surface of a pond after a few hours frost, or as the scum upon a basin of warm water. We learn, in fact, that the surface crust, which we so fondly name *terra firma*, was formed by the gradual cooling of a mass of fiery fluid matter: and when we consider the effect of heat, how it disperses the most solid matter into vapour: and further consider, that the highest heat, we can produce or are now cognizant of, is—can be nothing to the heat which nature may evolve, which Geology reveals to us as once existent: and when ever and anon we behold a portentous comet whizzing by us on its mighty circuit round the skirts of space, and find it to be a fiery mist, an unformed mass of fiery vapour: we are led to conclude, that before the heat of our system had been gathered into or around the sun, or shut up in the bosom of the planets, or radiated off into and lost in the cool surrounding wastes of space; when it was confined to, but diffused throughout and over the whole; this earth, those planets, that sun,—this system was, comet-like, a mist of fire. The stretch is easy then to the other suns and systems, to the whole matter of the universe, and we have what is called the Nebular hypothesis.

The inhabitants of this Province know what a mist is, and that the heat of the Gulf Stream is the cause of the superabundance of that article here. But let them fancy, not a little mist coming in upon and hiding up the little city of Halifax, but the whole ocean dissipating, the whole earth dissolving, the planets and the sun dispersing into mist:—what a sameness would be here! No solid place of rest: no distinction of air, earth and water, of sun and planet: interminable fire: boundless, unmitigated, flaming mist! No variety of heat and cold, but one unvaried, unvarying temperature! And all at rest—no current, no motion, no change! And suppose this to extend through space, and to be the condition of the matter of the wide universe! There would be unity here indeed—primitive unity, sameness—the unity of unvaried chaos. But God introduces motion into the inert mass, and, behold! all things become new. There is a forward motion introduced, and besides, and to counteract it, there are centres appointed, and the principle of gravitation is impressed upon all matter. But let us confine ourselves to our own system. There is a tendency to accumulate upon the centre, and thus the sun is formed. Meanwhile the nebulous matter, which still on account of the great heat will far out-

bound the limits of our present system, contracts by cooling ; for much of its heat is being gathered into the sun, and much radiated into surrounding space, and some becoming latent. As the mass shrinks, in cooling, the laws of rotatory motion speed it in consequence with ever increasing velocity round the sun, until, the increased centrifugal force becoming too powerful for the central attraction, a zone of vapour on the skirts of the system is detached from the rest. This zone of vapour breaks up and gathers into one mass. Such zones, separating from the sun at various distances, form planets in the state of vapour. These, having by the laws of mechanics each a rotatory motion, eliminate from their own atmosphere, as they cool and contract, rings and satellites, in the same manner as they themselves were originally eliminated from the atmosphere of the sun.

And thus the system is evolved : and what variety does its consolidated form present ! Who from looking at it would ever fancy that it had once been mere diffused vapour ? We have the central parent sun, and the offspring sister planets ; heat, and cold ; light, and darkness ; this fine frosty air, and yon beautiful blue sky and glorious firmament. We have the various magnitudes, densities, velocities, and motions of the sun and his various planets ; of the planets and their various satellites. We have their all various revolutions, and periods of revolution ; temperatures, and atmospheres ; colors, forms, and constitutions. But the time would fail me to indicate all the variety of this beautifully diversified system. My special delight is its Unity. And is it not a glorious unity ? Do not the planets depend upon the sun : do not the satellites depend upon the planets : and do not all depend the one upon the other ? I could prove to you that they do ; and had I more time, perhaps show you, that they were each the complement of the other, and necessary to the whole. Take one away, or alter it much in any respect, and you will cause a wave of destruction to sweep over the limits of the system. Behold the sun, how finely it governs, and lights, and warms them all, because it is just there—in the centre ! Behold the planets themselves, so placed, and at such distances from each other and the sun, that they cannot harm one another ; and though they do cause, by their respective and mutual attraction, a ceaseless variation in their courses, yet that variation, continuing not forever in the same direction till it reach destruction, but at the proper time returning again to whence it started, and all things being again restored ! Va-

riety in unity is the law of nature. And behold the whole system—how stable it is, because the governing mass is there in the centre ; and the obedient planets move round it in no other than circular orbits, are projected all on the same plane, and go all the same way perpetually, from west to east !

But what though Geology, confirmed by all her sweet sisterhood of sciences, proves that this earth has been attendant on you sun for myriads of ages gone by : and Astronomy, continuing the story, tells it may be so for as many ages to come : what is ail that to you ? Your experience, your feelings, are your best evidence, your best assurance. You have never doubted the stability, the unity of our system. You have never fancied, that you would see the time when the sun would oscillate, or any of his offspring “run lawless through the sky ;” when planet would war with planet, or sun with system, and all or any with hideous collapse meet destruction in each others arms. You have been confident in the peace and harmony of at least this little group of islands in the beautiful blue boundless ocean of space. For six thousand years, history informs us, that on our sires the sun has risen and set, and the planets in their order have adorned those evening skies. For six thousand years all things have been as they are, as they have been from your birth. This world has been racing round the sun in the company of her beautiful sisters with inconceivable velocity ; she has been whirling ever round and round her own axis :—you have known it, you know it now ! yet you do not start, you do not pale ! You have never felt inconvenienced by the motion, you have been even unconscious of it, nor have seen anything liker a disaster in nature than an occasional comet or periodical eclipse. Regularly have you lain down to rest hopeful of rising on the morrow, and, though a little thing can take sleep from man’s eyelids and keep him tossing till morn, you have never been disturbed by the thought that the earth might lose her path in the darkness of the night.

What harmony must there be in nature to produce this confidence in man ? Ah, you would rather trust yourself in the hands of God, however much you may tremble at the thought of his presence, than you would in the hands of man ! You step into a railway car, but you have fears of the issue of the journey ; and no sooner does the oscillation of the carriage prove that you are going at express speed, than you tremble. A stone may upset you, and toss you into the arms of death ! Or you distrust the officers of the line :—they may be negligent ; their orders or signals may be wrong or misunderstood ;

and before you are aware you may be in collision with another train, and crushed into a formless jelly, or scattered in quivering lacerated fragments along the ground! But you can trust God! You feel no fear but that his infinite wisdom, power, and love, will order this little world aright, but that his will or his angels, but that he himself will guide each planet on its own path, and govern to harmony yon continental Sun, and these Society Isles. Or you step on board a steamer, and no sooner do you feel in motion, and no sooner does the incessant vibration show that the steamer is fairly up, than you begin to fear, some lazy look-out or negligent engineer, some imperfection in the machinery or the vessel, may occasion a collision, an explosion, or a leak, and blow you out of the world, or send you down alive into an untimely and a watery grave. But you entertain no fear of the vigilance of God, or of the perfection of his machinery. You do not dread being buried in the bosom of any comet, or dashed on the breast of any sun. And stable as are the foundations of our system, your trust in them is well-nigh as undisturbed, unwavering, and immovable.

But there is a unity still more wonderful and beautiful than the unity of this lilliputian system of ours, and our confidence in it—the unity of the Universe. I shall however find a more fitting opportunity of indicating this hereafter. Our brief excursion through the upper regions has for the present contented me. I am contented to leave their illimitable spaces, and to return home—home to this sweet little islet of ours, this mother Earth. In endeavouring to show you, that from the beginning of her existence she has constantly become more and more varied, yet continued ever a unity, how shall I commence? How shall I begin to show you, that she and all upon her have developed from the simple to the complex, the homogeneous to the heterogeneous, have grown into variety and been now and always bound up into unity?

You all know that nature in every case starts with elementary atoms. You have the elementary atoms of inert matter, in its original gaseous or liquid state, combining into crystals, and these again gathering into mountains; the elementary cells of both plants and animals combining into trees, fishes, beasts and birds. I believe I shall not be going out of my course, if I here illustrate the law of nature's progress through variety to higher unity in a very popular way. Let us take the elementary atoms of inert matter and behold them combining into crystals, and gathering and swelling into mountains. What

a variety is united in the bosom of that mountain! How many atoms, of how many elements, in how many varied crystalline forms! And did the original atoms lost in others of their own kind, and did the higher crystals occupy the position or exercise the influence in nature, which does that mountain? Did they rise from earth, and, supporting heaven, tabernacle in blue, sunny or starry skies? Did they gather the clouds from the expanses of air, and cap their peaks therein; roll the rivers down into the replenished sea, and irrigate the rejoicing world; robe their sides in forests, and clothe themselves in the grasses of the field; feed the lamb; nest the eagle; breathe new life into the invalid; and form the character and muscle of the stern and strong mountaineers, who, ever and anon issuing from mountain fastnesses, overturn old and erect new kingdoms in this lower world? And is not the mountain, while thus more wonderful in its variety, also thus a more noble unity than the insignificant atom, or beautiful but little crystal? Again, let us take the cell and seed of the plant, and behold them gathered and growing into the tree. Was the seed, buried in the earth, like that tree in which all the fowls of the air build their nests, and under which the beasts of the forest love to repose, whose grateful shade is sought by man himself? Did it shoot a stem to the sky, and spread out branches recumbent on air, and cover itself with leaves which might feed on sunbeams all day long? Did it purify and clear the atmosphere, that man might live upon the earth; draw the clouds from heaven to moisten the cracking lips of the thirsty land, or drink up the marshes of a too soft soil; constantly drop the rich manure of its leaves around and prepare the future meadows, fields and gardens of the world? Again, let us take the spawn of a fish and behold it developing into countless salmon. No longer minute dots, they have the speed of lightning and dart through water whither they will. Princes of river, lake and sea, their dominion is as wide as the domain of the pure element which the sailor and angler so much love. They are kingly fishes, and their motion possesses a dignity as remarkable as the extent of their empire. But let us, further, behold an egg, and watch the unfledged bird issuing from it, shortly to soar as a winged eagle to the zenith, and sun itself at the very portals of Apollo. Who shall describe the eagle, bird of Jove, which seemed to the ancients in its invincible talons to bear Jove's thunderbolts? The loftiest mountain is its throne, air its kingdom! Behold it lessening out of sight in the heights of ether, as if on an expedition of conquest to the

sun. With wing as tireless as the wing of lightning it will round the world almost as quickly, and flash from the heights of heaven, like a beam, to plunder the dale, and return spoil laden to its aerie. Nor does it frequent the land and its airy spaces alone, but sports above the sea, and makes ocean its tributary. Ah! ocean, which "spoils armadas and makes rock built cities quake," has no terrors for it;

"Its talons anchor on the stormiest cliff,
And perch upon the very lighthouse rock
When winds churn white the waves."

CAMPBELL.

Well may the poet, regarding the dead eagle, exclaim—

"Fallen as he is this king of birds still seems
Like royalty in ruins."

And say, to make one step from the sublime to the ridiculous, could such an exclamation be reasonably made over a broken or a corrupting egg? Need I add more—need I exhibit man and brute in their original chaos, and then ask you to behold to what they grow—the horse, whose neck is clothed with thunder—the man, the image of his God? Nay! the youngest sufficiently sees, that nature ever advances from homogeneity to heterogeneity; from the unity of insipid, universal sameness to the unity of varied, diversified being; from inaction to united action; from incapacity to power.

But now, my friends, I would like to go more systematically to work: I would like to show the earth herself as a whole advancing out of liquid chaos, even as out of the egg you saw the eagle grow.

The science of Chemistry leaps to my desire, anticipates my every yet inoperative wish.

We learn from Chemistry that under extreme heat no elements will combine, and, therefore, that in the earliest ages of the globe combination was impossible. But as the earth cooled, the elements which God had made for each other, giving them mutual affinities, came together, but at first only by single atoms—one atom of one element uniting with one atom of another. In that age the earths and alkalies were formed; for they are of this primitive description, and the simplest of all combinations. As the temperature decreased, as earth further cooled, combinations of increased diversity—higher unities became possible, and the metals were produced; for in them two, three, and four atoms of one element unite with one or more of another. As the cooling process

went on, higher diversities, higher unities appeared, and four, five, six, eight, nine, ten atoms of three or more distinct kinds of element were bound into a unity. But when we pass up from the earths, the alkalies, the metals, and the salts, from inorganic matter to organic, we find that the organic obeys the same law as the inorganic, that as the heterogeneity, the complexity, the variety in unity increases, so the stability decreases; that, in fact, the earth must have cooled much further, and evolved many other conditions, to allow the elements to combine into the organic matter of a tree, and cooled further, and evolved still more and higher conditions, to unite into the albumen, fibrine, and body of an animal:—and these latter are the most diversified and highest unities of matter which we know. I revel in the contemplation of this most sure and clear exhibition of the law of nature's progress from the simple to the complex, from lower to higher unity, from the uncombined chaotic universal atom up step by step to that wonderful, mysterious, inexplicable combination, that form so fearfully and gloriously made, that body which is the tabernacle of the spirit of man, and may become the temple of the living God!

But, my friends, the story of progressive variety and of progressive unity, which the earth from her depository of secrets, from the depths of her bosom, has poured into the delighted ear, and laid bare to the ravished eye, of that patient explorer and beautiful science, Geology, is more full and wonderful than any I have yet told, and more fairylike than the fairest tale of the Seven Champions of Christendom, or the most extravagant, yet pleasing story of all the Mythologies. Many here know it already, but it cannot be too often told: and besides, as my purpose in treating of it differs from that of the Geologist, my treatment shall partake of the novelty of my purpose.

Experimental Geology places beyond a doubt the belief, that this earth was originally fluid. The heat, which maintained that liquid condition, was however gradually radiated off into space, lost in the surrounding cool expanse; the earth cooled. A crust was formed upon the surface, as scum forms on warm water. The upper crust must have been thin; but, the cooling process never ceasing, an inner crust was formed, and the upper crust, being of greater circumference than the lower, could not settle down upon it without breaking up into ridges,—a phenomenon which we saw beautifully illustrated some weeks ago on the lakes at Dartmouth. Above the lower water ice had formed a crust of snow ice, which, being of greater expanse than the lower water ice, had, in settling

down, not settled flatly or evenly, but broken up into ridges and down into hollows, making the lakes one continuous succession of ups and downs. Thus early did the world begin to develop variety of surface; thus heights and hollows began to be all over the earth. Meanwhile the vapour, surrounding the world, through which no ray of light could yet penetrate, being partly precipitated in rain or water, as dew is on an inverted tumbler, caused a limitless ocean to drown the globe. The heights and hollows, which I have just described as forming over the surface, sinking deeper and rising higher ever as the earth cooled more and more and the upper crusts settled down upon each new lower one, in process of time—the waters occupying the hollows, the ridges here and there overtopped them—*islands* invaded the air, and, as stars in a stormy night twinkle distant from each other and solitary through the rifts of clouds, dotted with their higher combination the still boisterous and lately interminable ocean.

And now, my friends, observe, as I proceed, how the world advances; how she develops ever new variety and higher unity; how all the newly developed and more advanced variety accord, harmonize; and how each is in itself a higher unity. For is not the dry land a higher unity than the ocean—combining in itself, as it does, what might be converted into ocean, and something over and above; more forces and higher conditions being also necessary to its formation? And, however the sailor may love the ocean, that he feels it monotonous, and values the dry land more, is evident from the delight with which he, voyaging the Pacific, hails some wave washed, but rock bound South Sea Isle! His rapture at least confesses the pleasure of the change, and leads me to remark, that we have at any rate a higher unity, when we have both land and water harmonized in the young but rising, developing world.

But I left the world an ocean dotted with islands, and such I find her on my return. Creation, however, has made a great stride: the seas are full of vegetable and animal life, of seaweeds, of molluses, radiates, and fishes. No longer have we mere inert matter, but that in mysterious combination with a higher nature with life vegetable and animal. Can nature go further? Whether she can or no, we may at least be sure, that these forms shall receive nobler developments; for the ocean is inferior to the dry land, and when the dry land shall be fitted for the reception of inhabitants its plants and animals shall surely correspond to its own higher status in the scale of being. But further, my friends, the fishes, that inhabited the

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then seas, were not like our osseous fishes: they had no internal skeleton, but were covered with, framed externally in plates of gristle, cases of cartilage. Like the bird in the egg, they were fishes as it were in the egg—fishes in embryo; but thereby the better fitted for their very warm seas, and each the better armed against the powerful forces and cannibal carnivorous appetites of each.

But let us turn our attention now to the islands. They had risen and enlarged. Land which lay below the ocean, and on which some sediment had been deposited, having been elevated all round the shores of many, their circumferences had been greatly extended. Vegetation had appeared upon them; that low sort which only colors the rocks it encrusts; but this was preparing a soil. The washing of the rains too had been wearing the rocks, and also forming soils. There were lakes in the interior, slow flowing rivers toiling through the midst, swamps all over these islands. At length God spake, and they were covered with forests: and I may be permitted in this land of forests to say—

Forests rose fluttering o'er the isles below,
And 'twas an island jubilee, when, lo!
Grandly, divinely, God's Almighty hand
Fixed their unfurled standards in the land!

But the forests then were not like the forests now: they were suited to the land on which they grew, and the air which they breathed. The land, as I have said, was island and half water, interminable swamp. The air was mist, and overcharged—laden with deadly carbonic acid, which steamed up from the swampy soil. Heaven was but a reservoir of concentrated choke damp. No sunshine gladdened the landscape, but its dim mournful twilight might have been the home of melancholy. A dense, unbroken, unending covering of dark cloud canopied the world, and dropped upon the earth ceaseless rain—a gloomy watery pall, such as some of us may have seen stretched across an Italian gorge, or Highland ravine. Therefore the trees were of a soft succulent nature; mighty reeds they were, gigantic ferns and calamites: and though firs grew abundantly, yet even these appeared oftentimes hybrid, partaking of the soft fern character. But these were just the trees for the time, and this was their golden era. They sucked up the moisture of the land, drank in the moisture and carbon of the air, which is their breath of life; and dried and firmed the one, and cleared and purified the other. How long

this condition of things continued, who shall say? The periods of Geology are not to be measured by hundreds of years, but by myriads of them. While these years are passing over the world let us occupy the time by observing again, how greater variety and higher unity attended her progress.

Each successive Geological period not only introduced higher existence into our globe, but deposited upon the surface its own peculiar strata—the wreck, the dust of its existences, and thus in each succeeding age improved with finer loam the surface of the earth. These trees grew up, and died, and were buried where they grew; and their children rose out of their graves, and there were they also buried; and generation after generation, arising out of, descended again into the same sepulchre. Thus did the then swampy islands become moist mounds of vegetable decay. The overflowing rivers, too, mingled the waste of the rocks and lands with that vegetable matter: or bore both in their sluggish currents to the sea, and formed vast deltas—extending the empire of the land; or strewed the deposit wide over the bed of ocean. Thus was the whole surface of the globe, by the deposit over it of the rotting leaves of endless forest, prepared to produce out of a richer soil a more useful, and even more universal vegetation, such, for example, as the grasses of the present day. But some of these mounds of vegetable matter, too, were afterwards, in some convulsion of nature, engulfed in the greedy maw of the world, and, disgorged again, have now a beautiful resurrection in our Pictou coal. And as these trees, arising from their graves, give us light and heat now, so were they then instrumental in bringing about, what they ushered in, the illumination of the world. I have already indicated how the world continued always cooling. The vapours of ocean, condensed by the continued cooling into clouds, would from the same cause drop more and more of their aqueous burden upon the world, and they themselves gradually thin. Ocean too would evaporate less and less, as the heat decreased. Thus would the atmosphere be ever clearing. But the trees were no idle spectators of this beautiful progress. They drunk up not only the superabundant waters of the earth, but also the superabundant vapours of the air: and, behold! the dense cloud canopy of the world was rent, and through the rifts what sight appeared, which made the trees so glad? The sun, the glorious sun, who rose, not stooped, to conquer, and with the army of his beams swept in irrecoverable rout from the bosom of heaven and the face of earth the hosts of cloudland! What

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new variety now delights us, and what beautiful unity! The father now beholds and smiles upon his child, and the child, beholding him and smiling back again, suns itself in his smiles. And when at length Sol sinks to rest, and the glorious blue firmament all dropped with golden stars is expanded over and hung like a curtain around the earth, and you are called to look back upon it, do you not feel as if you were gazing on quite a new and other world? Progress and variety are developed everywhere—in the water, on the land, and in the air; and the result is beautiful unity.

But by the aid of those trees the air has made still further progress. You all know that the air which we now breathe is composed principally of two gases—carbonic acid and oxygen. Now plants inhale the carbonic acid and exhale oxygen, while animals inhale oxygen and exhale carbonic acid. Were the air all carbonic acid animals would not live; were the air all oxygen plants would die; air being however neither of these alone, but a combination of the two, both animals and vegetables exist. Nay, further, as each exhales what the other inhales, and inhales what the other exhales, each is as it were the breath of life to the other; each preserves the other in existence. But in the early ages of the trees, which we are now considering, the air was almost entirely carbonic acid; and that animal would have been a strange one, that could have breathed it long and lived. The trees however found it a royal feast, a prodigal largesse of dainty. But, though always inhalers of carbon, they were not always exhalers of oxygen. We know that this power is conferred upon them only by the light of day and the influence of the sun, and that at night, in darkness, they exhale not oxygen, but some of the carbonic acid which during day or light they have inhaled. Therefore, until the covering of cloud had been broken away from the earth and the sunshine had fallen upon the woodlands, until the pure beams of Sol had vivified the forests, though by devouring some of the carbonic acid and digesting it into wood they might have diminished the quantity in the atmosphere, yet plants could never have become, what they now are, the counterparts and counterpoise of animals; there could never have arisen between them and animals that reciprocity treaty on whose existence now their individual existence depends. We have however already seen those eyelids of the sun, the clouds, rolled up and the sun's bright eye opened full upon the world. The trees had now become exhalers of oxygen. What if they had continued the only land existences, and, exhausting the

air's carbonic acid, have killed themselves in their own, to them, poisonous oxygen exhalations! But no sooner was the atmosphere, as I have shown, prepared for animal life; scarcely had the sun begun to shine visible upon the world, than, as if born of his warmth and vitality and the pure breath of heaven brooding upon ocean, huge reptiles, the spawn of ocean, crawled out of the deeps, and, invited thither by the breath of the trees, possessed the land and air. No sooner was the atmosphere prepared for animal life, than animals appeared to breathe it; and besides, by an interchange of breath, to preserve in its ancient existense the family of plants.

But what a stride has creation made. During innumerable ages the world of forest had been strangely silent, no sound of living creature breaking the dreary and monotonous dread wizard silence of those truly woodland solitudes. But now the earth swarms with enormous existence! The huge plesiosaurs, heliosaurs, ichthyosaurs, and all the saurians, the iguanodons and mighty crocodiles of that wondrous age have become the lords and rulers of the wide world; and are possessors not of sea and land alone, but as dragons, more hideous and monstrous than romance ever fabled, cloud the air and darken the sun with the spread of their vampire wings. But, behold, how beautifully things advance! See how vegetable life had, as it were, crept out of the sea, the lowest of solid conditions, and covered the swampy land, a swampy vegetation! See, too, how animal life had, as it were, risen out of the sea and possessed the land, an animal life that was half fish—an alligator type of existence: for the land had not yet become thoroughly dry land. Those reptiles were half fish. They lived chiefly upon the produce of the seas; and such of them as were peculiarly landlivers were not grass feeders, for no proper grasses yet grew, but with one twist in their mighty forepaws bore a lord of the forest to the ground, and, as lightning strips an oak, in a second denuded it of its luscious foliage. The dragon birds, too, fed not so much upon the produce of the land as upon the insects of the air, which were fabulously abundant: or, wading out into the waters of some bay or inland lake, like

“The moping heron, motionless and stiff,
Which on a stone, as silently and stilly,
Stood, an apparent sentinel, as if
To watch the waterlily.”

HOOD.

bided their time, and suddenly in their long beaks seized their unobserving or incautious watery prey.

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Thus far have you followed with me the march of creation. Thus far have we seen, that from the first beginning of her career were her ranks evermore increased; evermore swollen by higher and higher varieties and unities of existence, and all the while without disorder; that each increase appeared when a place had been prepared for it, and at once assumed its proper position in the duly subordinated, grand—united army of creation—of creation! who went forth conquering and to conquer, surmounting one after another the ever rising heights, and subduing one after another the ever increasing difficulties of her march to perfection.

And now, ere the world was fitted for still higher existence, it underwent many changes. Plants depend for existence almost entirely on inorganic matter. They grow out of the earth, and by their roots gather from the mineral matter out of which they grow what becomes their vegetable tissue; or may rise gigantic, towering to the skies, like the Alpine tannen of Childe Harold, from even the bare, unnourishing rock, and collect their vital sap from air alone. But the animals never existed, which could extract blood, flesh and bone from earth—from minerals alone, or live on air; from the consumption of plants, or, if carnivorous, of brutes that consume plants, they derive their necessary vital nourishment. We have consequently seen, that on the earth trees first appeared and occupied the land. Then came reptiles, most of which lived, as I have shown, on the inhabitants of the waters, but some upon the leaves and, perhaps, seeds of the trees. However, before thorough dry land animals, animals that could not fly to the ocean for food, could be created, at least for any purpose other than immediate death, the earth had to bring forth vegetables in abundance of that sort on which animals feed—dry land vegetables, the grasses and other profusion of our meadows, besides the seeds and fruits and inestimable variety of our wooded wildernesses, which, sustaining life themselves, also prepare the land by the manure of their leaves to produce the peculiar herbage native to the delicate animal palate.

But to proceed. I have indicated how that from the beginning there was manifested an ever increasing subsidence in the hollows and elevation in the heights of the earth. The most lofty heights are the most modern: for the igneous action at the heart of the earth did not so often make lowlands mountains, as it burst them asunder, and, sloping them on either hand, protruded through their rent, elevating to heaven, a modern hill. Thus nature was provident of her ancient stratified

HOOD.

seized their

lands, and raised only new, bare, barren rocks into the frozen, arctic heights of æther. Mountains were thus elevated over the globe; lands raised out of the ocean; the islands gathered into continents. But those lands, which had then become and have ever since continued to be dry lands, had not been always such. There is scarcely a spot on the present dry surface of the globe, which has not been the bed of river, lake and ocean, as well as the inhabitant of air; scarcely a spot which has not been subjected to the fructifying influences of all possible vicissitudes and changes of water and of air, since earth began to form. Besides, I have told you how each Geological period stamped its character on the then surface of the globe, deposited its peculiar strata on the world, and—to adopt the noble lines of Longfellow,—

Departing, left behind it
Footprints on the sands of earth.

Further, the various forces of nature, especially the igneous forces of the world, left not these strata to lie as they had been deposited, the one above or below the other, but by convulsions of the land tilted up the lower ones, exposed them to the air, mingled them with the upper strata, and made the surface of the world a combination of all—a rich, a fruitful, a perfect variety and union of soils—a mingling of all the riches of the various stratifications, which severally nature had been so long and laboriously elaborating. The temperature of the earth, too, had greatly declined. A contrast between the poles and the equator was beginning to be apparent, and the zones were now in embryo. Then did the succulent forests, the harvests of whose leaves had been reaped by innumerable ages and strewn over the world as manure, out of which might arise more useful, though less showy vegetation, retire to restricted limits, and the reptiles of earth and sea and air occupy only a small portion of the world. Then did the grasses wave along the prairies and meadows, and climb up the heights of earth, for now was the world about to be replenished with graminivorous and carnivorous life. Then did the forests exhibit grander forms than of old, the oaks and the chesnuts, the beeches and elms, the walnuts and sycamores and limes, banyans and baobabs, and all the other distinguished lords and monarchs of the woods. Even the seas had long produced, besides their other varieties, the more perfect, the osseous type of fish. The birds were no longer only dragons darkening, but also objects beautifying the azure of heaven, the sun himself, and filling the air and the woodland recesses here and there with beauti-

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ful plumage or still more beautiful sweet music. And, behold, a higher race arose to occupy the dry land! The graminivorous and carnivorous mammal spread from pole to pole! Then was the age of the great mammoth, the great rhinoceros, the great elephant; then was the age of the lion, the leopard, and the tiger; then was the age of all the lordlier and fiercer brute types of mammal existence! The plains of Siberia shook beneath the tread of the gigantic elephant; the blended howls of tigers and hyenas affrighted the British Isles; from north to south, from pole to pole, the mightier mammals ranged and ruled the world!

And now, my friends, let us look back down the vista of ages, back down the long, and, I fear for you, tedious way which we have travelled upward together. With what did we start? A formless, indescribable world of vapour: and thence began a continual ascent. First interminable ocean, and its crustacea and fishes; then swampy islands, and their rank swampy vegetation; then larger islands, trees, insects, and reptiles; then continents, grasses, hardwood forests, and mammals. But when I speak of the ages of trees, of reptiles, and of mammals, do not think that I mean to indicate these creatures as absolutely the highest existences of their respective periods. Thus in the carboniferous era of vegetation, besides the trees, which covered everywhere all the dry land, there may have been a few salamanderlike creatures, half fish, half reptile, or even some reptiles, issuing out of the seas and appearing on the dry land to prophecy of the yet higher life, which was to succeed the trees, the life of reptiles. And we know, that when the reptiles did succeed, there came along with them also some mammals, who in their turn prophesied of the approaching abundance and rule of their own higher races. But each Geological period was particularly characterized by the extraordinary and universal prevalence of its particular stage of existence. Thus in the silurian period, the age of ocean, fishes lived everywhere, and the same tribes roamed the round and waste of the world of sea. Then when the trees appeared upon the land, they occupied it altogether, and the same trees were everywhere—wherever land rose above the ocean. So with the reptiles; they possessed all the land, and crowded sea also and air. The tendency of each existence in its particular period was to usurp the world. And thus in the age at which we have rested, the greater mammals roamed everywhere; the same elephant was found at the Equator, and again at the North Pole. Doubtless the equability and high state of the

temperature throughout all these ages had much concern in the production of universality in each kind of existence. But as each Geological period approached its termination, its characteristic existence began to be restricted within limits; and this restriction was a prophecy of the approaching advent of some higher race to occupy the extent and assume the empire which they were relinquishing. Thus the reptiles gradually diminished before the mammals abounded.

But, my friends, not only was there the general progress which I have indicated, but there was progress in all directions. The sea advanced from a limitless chaos of briny waters to waters below the firmament, and above the firmament; to oceans, gulfs, and estuaries; to rains, and beautiful fresh water lakes, and mighty amazonian rivers. The air advanced from a dark, dense, black, rayless fog to a clear firmament navigated by snowy clouds and dazzling stars; from an atmosphere deadly to animal life to one so variously constituted, as to suit at once the necessities of plants and animals. Vegetation advanced from the seaweeds to the landweeds; from the rank, succulent forests of the carboniferous era of swamps to a variety that included, besides our meadows and prairies, also our hardwood wildernesses, our oaks and chesnuts, our banyans and baobabs. Animal life advanced from the crustacea, molluses and radiates of the sea to the cartilaginous and then the osseous fishes, and took to its bosom in succession the reptiles and marsupials and dragons of earth and air, the beautiful birds and magnificent beasts of the great mammalian age.

But I have not yet exhausted the progress of the world. I stopped at the age of great beasts. I indicated how the poles were gathering the cold around themselves, and the zones were then in embryo. This tendency to variety in the temperature of the world developed more and more. The poles at length became the abiding palaces of winter—oceans of ice, and continents of icebergs; and the intermediate spaces to the equatorial highroad of the sun were beautifully graduated into the varieties of temperate and torrid climes.

You all know the poles are the parts of the earth furthest from the sun, and therefore now the coldest. In the early ages of the world her own heat was so great that she did not need the heat of the sun, but by her own warmth and the universal spread of sea preserved a pretty equable temperature over her whole circumference. The dense clouds and vapours too in which she was swathed as in a wet blanket, prevented her heat from being soon lost, from being radiated off. But, when those

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clouds cleared away and the air waxed pure and dry, radiation went on rapidly, the earth cooled fast, the sun's heat became welcome and its absence or distance sensible; the poles became frozen wastes, and the equator a tropical clime. This was further aided by the massing of the islands into continents and their elevation into plateaus and mountains. But, as these varieties of zone and clime were developing, the lapse of ages was hastening on other changes not less remarkable. Now had come the decline and fall of the mammal empire—the great beasts gradually lapsed from the dominion of the world. No longer did the rhinoceros or elephant range the steppes of Siberia and the reedy plains and jungles of India. No longer did the hyena and tiger with yell and howl affright the British Isles, and make the rising deltas of the Ganges terrible. No longer did the fierce or mighty monarchs of the brute creation rule the world. Their dominion waned into a limited dominion; they were confined at length to the torrid zone, and became emphatically tropical animals.

But this wasting away of these mighty mammals, this restriction of their limits, and, as I might also show, wane of their physical development, like the decline of former races, vegetable or animal, which had once been universal, was a mute, but eloquent, unmistakable prophecy of a higher race about to succeed, about to assume the sovereignty of the globe, and to seize the reins of empire which had dropped from these lordly brutes and were now hanging idly and unhandled down the sides of the world. And other signs foretold the great event. About this time, that is just before the creation of man, appeared on the land that mild animal whose absence man would feel in so many and various ways—the sheep. Now too first appeared in the sea the cod family of fishes, the haddock and others, the value of which the inhabitants of this Province peculiarly know. Now the cereal grasses began to grow; the corn, the wheat, the rice, the maize, to nod along the plains, to fill the *cornucopia* of earth with an overload of abundance, and give the world the air and aspect of a golden age. Now appeared amongst the trees those most precious ones—the apple, the pear, the plum, and all that family of fruit-bearing beauties. And whilst choiring birds now filled the air with richer strains, flowers too began to be more than ever abundant; to roam o'er field and fell o'er hill and dale, accompanied by song, and the forests, already bathed in music, to drown in blossom; to rove over the world in undulating seas of perfumed efflorescence to the moving, melting rise and fall of sweet bird minstrelsy.

Behold how beauty and luxury, as well as abundance and variety, precede the advent of man, and, looking back upon the impalpable and wizard region of non-existence, where he still lingers, and whence they have just issued, beckon him forth to possess and enjoy the world.

But let me dwell a little upon and still more fully indicate the variety and unity of the palace so elaborately built, furnished, and ornamented for man. The world was then, we believe, very much what it is now; you have only to consider this, and you will understand that. I have told you of the beautiful variety of temperature developed in the zones, and how the great beasts were at last confined to the torrid clime: but each zone still had its own descriptions and varieties of animal—a variety, apart from its uses, so pleasing as to be the cause of the countless beast shows, menageries, and zoological gardens maintained by the wealth and wonder of civilized nations. We that inhabit the temperate zone know its animals: but which of us does not wonder over the parrots and birds of paradise, the sharks, the boa constrictors, the crocodiles, the lions, elephants and giraffes of the tropic suns, as well as the great bears and reindeers of the arctic snows. But, my friends, if the world was a zoological garden, was it not a botanical garden too? Then, as now, at the equator behold balm, frankincense, and myrrh; coffee, and tea; cloves, nutmegs, pepper, mace, and cinnamon; sugar cane, cassava yams, and maize; plantains, breadfruits, and palms; sandal, ebony, teak, and banyan. Further north lade yourself with corn; then, binding your brows with myrtle, gladden your heart with the grape, and suck the juices of pomegranate, orange, apricot and peach beneath the shade of the cork, the cypress, chesnut, or walnut trees—“*recubans sub tegmine fagi*”—a quotation all know. Cross the Alps and you shall still have wheat, barley, and oats; strawberries, apples, and pears; nor shall the forests be unworthy of your riveted gaze—those oaks, those beeches, and those elms. Further north you shall still find further variety—all kinds of fir—Scotch, spruce, larch; and, though those alders may be insignificant, you shall nowhere look upon lovelier trees than that red berried mountain ash, and that graceful lady of the woods—the vigorous, though delicately fashioned, slender birch. Aye, within the very Arctic regions wild flowers shall show the beauty and vitality of nature: there may be no glaring cactuses, nor splendid magnolia blossoms; but there shall be gems of efflorescence beneath the snow, and, when all else fails, the reindeer shall still tread

a kindly vegetation—the soft, green carpet of the reindeer moss. Thus the zones are not antagonistic; the one is not inimical to the other. True! the plants and animals of one zone are not fitted to inhabit other than their own, but they do not destroy each other; they have agreed to differ. This very incapacity of existence in other than one zone is the reason of all this beautiful variety, which we so much and so properly admire. Each zone has its own place on the globe; each its own variety of animal and vegetable existence; each is one phase of the great sum of being; each one variety in the unity of the world!

Further, my friends, the common saying is true as common, that extremes meet; there is but a step from the sublime to the ridiculous; extravagance and avarice (each in its own way) bring the spendthrift and the miser to equal destitution; and the prodigal heat of the ancient world was not more destructive to life, than is and was the prodigal cold of the poles of the modern. In fact, you have the progress of life repeated over again, though only in some measure and a small way, from the poles to the equator. There is a constant ascending development of animal and vegetable life from the arctic regions to the tropics; and the variety of all the ages is in a manner gathered into the one present phase of the world. One creature alone can resist the debasing influences of extreme cold or heat: we have not however come to the creation of man.

I can further show this gathering of all the past into the present, if you allow me the range of the world. You have boundless, almost islandless ocean in one hemisphere of the globe: you have also vast polar and tropic wastes and deserts in the other. You have in one continent, and that America, especially the southern portion of it, a sample of what the world was when only half redeemed from the dominion of the waters. There the reptile creatures still abound, and the vegetable kingdom is predominant; but the great animals are represented only by diminutive cougars—wildcats compared with the chiefs of their tribe, the tigers of Bengal. And in the old world you have the dry land continent, and the special domain of the great brute animals of the mammalian race. Look at a map of the world, and behold the endless diversity and variety of the combinations of water and land and climate there exhibited, and say, if any combination which was in the past is without its representative in the present; if any conditions necessary to past existence, vegetable or animal, are not now

in a measure somewhere here also fulfilled; if there is any reason why any past form of being should now in this condition and grouping of world be utterly extinct? Nay, my friends, I love to think that this age is a unity of all the ages! I love to think that from studying the surface of the present globe and its creatures you may learn much the same lessons as are taught by the strata of the Geologist! I love to think that nothing has been as yet lost, that no mode or form of being has as yet utterly perished out of existence: but though each has successively declined from its high estate, even as the empires of the world rise and fall, it has still remained somewhere in a diminished and less developed form to witness to the truth of the story of the strata, which tells, it was, and to graduate and swell the ever expanding, ever developing sum of being! Some races may perhaps have utterly perished: but these are the exception, and the rule is for others of the same kind to succeed—not indeed to the same sway, for the world may be under a new and higher dynasty, but to succeed at least to life; and to testify, that God, having once created, loves to preserve!

Thus was the world prepared for man a unity of all the ages—their variety in unity. But it went beyond them in that it had them all in one; and in this besides, in that it had a temperate zone, no perfect specimen of which existed before. A temperate zone with its peculiar conditions and developments, the one so thoroughly fitted for man! So fitted to restrain and abase his animal propensities, to give full play to and exalt his intellectual and moral powers!

But existence and climate are and were varied, not into polar temperate and tropic alone, but also into every possible differing degree of each—differing degrees produced by the infinite variety of form and mass assumed by land and water. Mountain, plateau, hill, plain, continent, peninsula, and island; lake, river, estuary, inland sea, gulf, little and great ocean; these by all their varieties of combination infinitely varied, and vary the several climates of the three great zones, and with them the existences peculiar to each: so that the varieties of animal and vegetable life are and were indefinitely multiplied. In the heart of the tropics thus might and may be found a comparatively temperate climate; in the bosom of the temperate zone a comparatively tropical one; nay, in the very arctic regions places with winters mild and moist as those of kindly, congenial, merry hearted Old England. Aye, a mountain based in the tropics did then, as now, rise into the arctic re-

gions of the upper strata of air, and in a graduated scale along its ascending sides exhibit the phenomena of all the zones. But this shows the importance of the conformation of the lands and waters of the globe, and leads me to dwell a little upon it; and where the variety is infinite, and we least expect such, we shall find law, order and unity.

Glance at a physical map of the world, and your attention will be immediately arrested by the remarkable division of the globe into two hemispheres—the one terrestrial, the other aqueous—the one occupied principally by land, the other by almost islandless ocean. But, further, on regarding the continents themselves closely you will observe, that they all expand towards the north and taper to a point towards the south: thus America; thus Africa; thus all the peninsulas and projections of all the terrestrial regions of the world. Again, you will find these continents grouping themselves in two and two, a northern and a southern continent connected by an isthmus or an archipelago: thus North and South America; Europe and Africa; Asia and Australia. Again, on regarding the eastern and western shores of the Atlantic you will be astonished to remark the exact correspondence of parts, the indentations of the one corresponding to the projections of the other; in fact that, if the Atlantic coasts of the old world and the new could be brought together, they would fit into each other cleverly as two parts of a pleasing puzzle. I might indicate other grand arrangements. These are only one or two of many remarkable coincidences, which I have no space here to particularize, all proving the dry lands to have been formed upon one plan, and by similar or the same powers and forces. But, my friends, now that you observe the lands to be formed with some design, you will not be astonished to learn that they are worked into the highest designs: that the four ancient elements, fire, air, earth and water, act and react upon each other in a wonderful way, producing the unity of this globe.

Look again at a geographical globe and you will find that the grand division of the lands, that is the old world, comprising Europe, Asia and Africa, is very broad from east to west, but comparatively short from north to south, and lying chiefly between the poles and the equator, leaves the polar region and the tropics to be occupied by ocean. This is a most bountiful provision of nature. For ocean cannot be easily overheated, being one of those transparent substances which absorb heat slowly and with difficulty: nor easily overcooled; for when the surface particles cool they become heavier than those be-

low and sink, while the warmer, lighter ones rise, a rise and fall which continues until the temperature of the whole mass is restored to an equilibrium. But how different with land. There is no rise and fall in the particles of earth: the surface absorbs rapidly and long retains the heat or cold: and in the tropics the old world would have been a scorched desert, in the arctic region a frozen wilderness. But regard that old world again and tell me, do you observe nothing in its internal arrangement affecting its well-being? Those plains, and plateaus, which are plains elevated on the tops of hills! those hills and mountains! are they thrown abroad undesignedly from the hand of God, as sea sand from the hand of a child? Are they scattered here and there for the purposes of variety alone, and with no end in use or unity? Gaze long and curiously, and be astonished, oh man, as the plan of the Creator comes up before your mind, and apparent confusion ranges itself into magnificent order!

As you ascend from earth to heaven you find the air wax rarer and rarer, colder and colder; and thus all high lands are colder than low lands, and the heights of lofty mountains arctic regions. Now look at the old world. All along the coasts of the frozen ocean and great part of the Atlantic the land is extended in plains; proceeding inwards and southwards it rises into plateaus; until out of the centre, and much nearer the Pacific and Indian oceans than the frozen sea or the Atlantic, it leaps into mountains whose summits are the loftiest in the globe and overlook one hemisphere. Then it descends with a comparative plunge into the Indian and Pacific oceans. Now consider the effect of a different arrangement. Had the long and gentle slope been from the Pacific and Indian oceans, and the plunge been into the frozen sea and the Atlantic; had those loftiest mountains in the world bordered the arctic regions, instead of, as now, approaching the tropics, the whole north of Europe would have been a frozen zone, the greater part of the old world would have been subject to endless, unmitigated winter—a waste of snow and ice, without plant, and uninhabited by animal. But, instead, the plains—those lands which least lower temperature—occupy the cold northern district, rise gradually into plateaus, and at length, towards the Pacific and Indian oceans, leap into unequalled mountains, transporting into the bosom of an almost tropical country the grateful colds of a northern climate, doing just what ought to be done, tempering excessive heat, and bringing a bracing air within easy range of an enervating latitude. Now look to the

new world, this continent of America. The form differs. Long and narrow it runs from north to south, and ranges through all the zones : but, being so narrow, no very great extent lies in either zone ; and that portion which is sub-tropical has its climate wonderfully ameliorated by mountain influences to be hereafter indicated. The mountains here also are ranged upon a plan. They traverse in one unbroken chain the whole length of the continent, from north to south. As in the old world, too, the lands have a long, gentle slope, and a short, rapid one. The short and rapid slope is towards the Pacific, the long and gentle towards the Atlantic. This arrangement of the reliefs serves wise ends, and shall be understood when we have further developed the intimate connection of the continents with the ocean and the air, the winds and the waters.

Than air or water, what more gentle thing
 Hath God created, or doth poet sing ?
 Air ! why we see it, touch it, know it not ;
 Most witlessly we breathe it, ah ! and doat,
 As on the visits of a spirit given
 To trance us into ecstasies of heaven,
 On those invisible, gentle stirs of air—
 Sickness they fan—soothe—dissipate, and care ;
 Health upon fluttering pinions—pleasure bear.
 Water, more visible, more felt, is still
 Soft as affection, gentle as the spill
 Of tenderest love from some large loving heart,
 That would its strength and joy to all impart :
 We drink it, lave in it, are glad and strong ;
 Earth also drinking, laving, is a song.

Indeed, my friends, such is the language of truth. Earth drinks and sings, and all her life and loveliness would fade away and perish out of her, but for the gentle, genial, life-giving, beautifying waters. Ah, the desert alone can tell what it would not give for a drop of water ! You hear the river rolling by into the sounding sea ! You see it flowing majestically on to be lost in abysmal ocean ! How comes the river still to flow ? why is the world yet undrained ? Does the stream, in defiance of that beneficent law of gravity, which, preventing stagnation, gives it motion down the slopes of earth to the parent tide, return upon its course and roll backward up the heights ? Impossible ! Air alone by the aid of heat can explain our difficulty. We have recourse to the winds, and these volatile beings, helping us to a solution of the enigma, reveal the unity and earnest purpose of all true nature. Let us enquire into the origin of the winds.

Why mounts the fire upwards in a pyramid of flame? Why is the ventilation of a church by the ceiling? Because heated air rises; expands, rarifies, lightens, and rises. Open the doors or windows of the church, and cold air rushes in and cools and tempers the atmosphere of the building, while by the ventilation in the ceiling the light, rising, warm air escapes. The world is ventilated in a similar manner. The poles are the regions of cold air, the equator of warm. The air therefore constantly rises from the regions of the equator, and there is a constant rush from the poles to occupy the vacancy. The heated air, which rises, after gaining a certain elevation sets out for the poles to fill again the vacancy caused by the rush thence to the equator. Thus there is a constant circuit of under currents of cold air from the poles to the equator, and of upper currents of warm air from the equator back to the poles: the warmth of the tropics being thus tempered by the cold of the poles, and the cold of the northern regions again tempered by the warmth of the tropics. Thus God has set all things, the one against the other. There are currents of ocean caused by the same influences of temperature, and corresponding to these currents of air. People, however, so much under the dominion of the Gulf Stream, and so near the polar current, ought to understand ocean currents sufficiently. In fact, my friends, a difference of temperature between two regions of air results always in a circuit of winds between them; and between two regions of water in a circuit of currents between them, until an equilibrium is restored. For nature labours, in both the cases of air and water, incessantly to produce and maintain an equilibrium, and has so constituted them, that they cannot rest short of this beneficent result. Thus, not only have we the grand permanent winds and currents, the tradewinds, and, so to speak, trade currents of ocean and air, originated by the grand permanent variety of zones; but, as we have in each zone again local conditions over its whole extent infinitely and continually diversifying its temperature, so have we an infinite sub-variety of winds and currents—contrasts of temperature, in fact, therefore winds and currents being universal. Ocean and air contain so many secret causes and sources of death to life animal and vegetable, that I cannot number them; but a universal one would certainly be the stagnation of either. The circulation of the blood is not more necessary to the health of the body, than is the tendency to an equilibrium of temperature, and, in this varied condition of the globe, the consequent incessant motion ex-

hibited by water and air to the preservation of the glorious existences, that replenish, inhabit and enjoy this delightful world.

There is, however, a zone of calms running round the globe in the heart of the tropics. There the great heat seems to neutralize all currents of air except the quiet upward rising one; and, though the sea has a set from east to west, yet in that region may be well realized Coleridge's poetical idea of

"A painted ship upon a painted ocean."

But this factitious calm is liable at any moment to the most extreme disturbance, to the hurricanes, the tornadoes, the sudden, terrible tempests which founder the bark and desolate the city or the farm: for the most violent efforts of nature are required to dissipate the evils induced by stagnation. Now the whole world was, I may say, a tropical clime and comparatively a zone of calms until the later ages to which I have conducted you: therefore epileptic fits, convulsions, hideous tempests were constantly necessary to restore to health her ocean and her air. Do you not observe, then, a wonderful wisdom and beneficence of Providence in ordering all, so that when the world became the habitation of the richest and greatest abundance and variety of high existence, and man, the noblest, most enduring, yet tenderest of animals, was about to be introduced and be set as a crown upon the head of creation, zones should be developed, temperature should become varied, and in the room of violent tempests and convulsions, easy agreeable utilitarian winds and currents should preserve the ocean and air in constant and uniform health?

But you do not yet see how those winds, of whose cause we have been enquiring, are made useful to the irrigation of the world; how they are, in fact, the water carriers of the continents! How the rivers return to the land; are brought again from the depths of the ocean to the tops of the mountains!

When the air above water is heated, rarifies, and rises, the water below, released from ordinary, necessary pressure, expands also and rises, in other words, evaporates. Thus the heated air of the tropics does not rise solitary, but carries the rising, evaporating water of the ocean with it aloft on its upward flight, and then onward on its course to the poles. But one cubic foot of air can contain only a certain quantity of water. When therefore this poleward tradewind

of the skies encounters colder currents, or enters colder regions of air, and loses its expansion, it becomes cloudy, heavy, and sinks; and further cooled sinks lower still and drops rain upon the world; and continues sinking, till at last it alights on the coasts of Britain, producing in those islands that climate, mild, soft, humid and equable, which, whatever others may say, as it has scarce any parallel, has, in my opinion, no equal in the world. With similar gentle and genial influences does a return tradewind descend upon the western coasts of Russian North America, making almost summer of even winter in an arctic district. In fact, all along the middle latitudes of the northern hemisphere do the tradewinds, returning from the equator through the upper regions of air, descend. Moist and warm south-west winds, they on their descent encounter the dry, cold northeasters, prevailing there and flowing from the poles to the equator. Their vapours are thus condensed, and drop in rain. Hence also arise transition winds, neither north-east nor south-west, but these in encounter and combination. This winter has weekly afforded us perfect specimens of these contests. Have we not weekly seen the north wind, veering round point by point, softened, deadened, killed by the south, which, beginning to prevail over the cold, was nevertheless itself cooled and robbed of its condensing vapours, dropping first Macnab Island snow, and then, when altogether victorious, torrents of rain. The temperate zone may be styled the battleground of the winds. Here the hot and cold, moist and dry, meet and contend: and the blood shed in their contests falls to the earth in copious rains. The blood of her warring nations, spilt on the field of Waterloo, yielded to Europe for fifty long years the peaceful harvests of commerce, art, science, and literature: and the blood of the warm, humid, south-west wind shed by the dry north-east, irrigating this temperate zone, makes it one grand storehouse of vegetable and animal life.

In these temperate regions also, subjected to neither extreme of heat or cold, local conditions have full play and result in many local winds all having their beneficent purpose in shed of rain: but I do no more than indicate their existence.

However, though the temperate regions are peculiarly regions of rain, constant rain, the tropics also have their rains, which for distinction are styled periodical. When the sun approaches the zenith, his great heat kills the dry north-east

and south-east tradewinds, which, blowing in the tropics on either side of the equator at all other times, preserve the skies there serene and cloudless. The heated air at this hot season and the moisture in it hurried at once aloft in the only current then prevailing, the rising one, into the uppermost cold heights of æther, and there immediately condensed, drop at once back to the earth perfect deluges. During these rainy seasons the tropics are in a ceaseless shower and vapour path. The sun however passes along to other places: the dry tradewinds again blow: and the earth there has no more rain, until the god of fire appears again in the zenith.

We have hitherto dwelt only upon the moisture which rises from the equator, but vapours are generated over the width and breadth of ocean. Wherever land and ocean meet, during the day a sea breeze prevails: for land is much more easily heated than ocean, and the air rises thence in consequence, and therefore flows in from the ocean with genial vapours. A prolific source of vapour is also the set of warm ocean currents into cold regions. Thus the Gulf Stream, flowing through the cold waters along our coasts, originates ceaseless vapour, which, borne hither by the winds, bathes us in continual beneficent mist. I might dwell upon the mighty circuits of these ocean currents, and show, how they perambulate the round of every sea generating vapour. I might show them striking on one continent, and diverging thence to another. I might tell, how the contour of the lands curbs the ocean currents, directs them whither to flow; and that they do flow thither, where they are most needed. But I can only touch upon these phenomena. Like the swallow skimming over a lake, I can only dip lightly here and there into the surface of the vast abysses of nature, hoping to induce you to bathe freely in all by showing you, that everywhere there is delight.

But I pass on to indicate, how the land itself is the great condenser of the moisture of the air. You see this in the case of dew. When the sun sets, earth cools rapidly; and the vapours of the day are condensed on her cold breast in grateful dews. The grand condensers however are the mountains. They rise with chilly, frosty peaks into the arctic regions of upper air: the lofty plateaus, too, with cold, sharp edges are vast minor mountains. These arrest the moist winds of the lower world laden with ocean vapours, and force them up their sides to their cold summits. They also arrest the currents of air, whose constant courses are high above

the world. They condense the vapours of these winds ; roll them down in beneficent torrents to the thirsty plains, which again deliver them to the ocean to be again evaporated and borne by the winds to these cold heights ; again condensed and rolled down ; and being arranged in one uninterrupted circle of uniform beneficent change. Examples of this system of irrigation are innumerable : let us take one of the grandest. I purposely select the Atlantic tradewinds, that flow to the equator, and will follow them into the land. In the form of north-east and south-east winds from the north and south of the equator, they blow equatorward softly and steadily across the Atlantic, bearing the vapours of that ocean along with them. They course over South America, which extends on either side of the equator, and would blow across it, but are arrested by the chain of the Andes. Forced to ascend that mountain range, they enter the cold region of snowy heights ; are cooled and robbed of their vapours, which, condensing into clouds, at length melt into rains, and descend in roaring, rejoicing, welcome torrents to the broad thirsty plateaus and plains, chiefly plains, extending from the Andes to the Atlantic ocean. This district of country is thus the best watered in the world, receiving the distilled waters of all the Atlantic. Here is the Amazon, that king of rivers, swollen by tributaries almost as kingly, whose shores are coasts rather than shores, bordering a sea rather than a river. But cross the Andes with that tradewind, which has thus been robbed of its moisture before passing to the Pacific side, and what do you find ? Nothing but a long, narrow, barren, desert line of coast. Have you not in this striking contrast sufficient proof of the condensing powers and beneficent purpose of mountains ?

But here, in passing, behold the reason of the peculiar arrangement, before indicated, of this American mountain chain ! Had it been placed on the Atlantic seaboard instead of the Pacific, had the long, gentle slope been to the west and the short, rapid one to the east, then the tradewinds, robbed of their moisture by the snowy heights, would have flooded the short slope on the Atlantic seaboard, and passing dry as dust over to the long slope, have blown over it without dropping, without being able to drop, a particle of rain ; and, whiffing away even from under its very lips any stray vapours presented to them by the tantalizing Pacific, have left it an unmitigated, monstrous, unparalleled, inexpressible desert. Now there is comparatively little de-

sert ; for the Andes are close on the Pacific ocean, and only a narrow strip of coast lies unwatered and desolate—widowed of the fair variety of nature's lovely life. What beautiful reasons God has for everything he does ! What a unity this world is ! * * *

Thus you see how ocean, earth and air are not independent, but parts of one whole : how the air bears upon its wings, which are the winds, the rising vapours of ocean into the land ; how the mountains, aye, and the edges of lofty plateaus, which act as mountains, placed in positions convenient for that purpose, how opposing winds, too, rob them of their vapours, and strew these over the world in beneficent rains. And now also you see why in the latter vast dry land ages of the world her zones became numerous ; how her winds multiplied and varied into hot and cold, moist and dry, that their encounter and combat might shed the embosomed vapours, and water the wide continents over which they flew : also why these lands themselves were elevated into stupendous mountains. One talks of being old as the hills, but the hills are modern compared with the plains. They were elevated, at least the loftiest of them, only in the latest stage of the earth's progress, when the earth became a dry land world adapted to the highest orders and most beautiful and abundant variety of animal and vegetable existence. While the earth was herself warm, ocean and earth's numerous mighty lakes were constantly exhaling vapours, which bathed the dry land in mist, nor rose to any elevation, being condensed at once by the colder space around the earth, as they now are periodically at the tropics. But when the earth waxed comparatively cold, and the sun became the chief agent in the production of vapour ; when continents and mighty drylands were formed it became necessary, that the few vapours which ocean did give off should not be lost—necessary, that into those lofty regions of pure air into which the vapours naturally rose, condensers—vapour catchers, also should rise, mountains should leap from earth to heaven, and, purveyors of the plains, stand ever on the beneficent look out to catch the wandering vapours in their cold embrace, and roll them down into the irrigating plains, to slake the thirst of the drooping plant and bathe in grateful moisture the parched tongue of the eager animal—to make the desert again blossom as the rose and the tiger leap again the broad ravine.

Now turn to life upon the earth. You have just seen how the world is a beautiful combination of the four ancient ele-

ments of fire or heat, air, earth, and water ; how this mutual action and reaction is worked into the unity of the world. Need I indicate, further than I have done, how the plant depends upon them all, and, in its present various development, on this present combination of them : and how the animal depends upon them also, and besides on the plant and on its own species, summing in its higher being the existences of the world, and is itself also, in its present development and variety, the creature of the present variety and development of the globe ?

But time presses. I have now conducted you through the changes and advances of our globe and its existences. I have shown you how it started a unity, and, while each advance was an increase in variety and progress in development, each advance was also a more remarkable, more pre-eminent unity ; until such a stage of variety was attained as defies the grasp and research of the intellect, while its unity, though not easily discerned, becomes, when discerned, its most remarkable, most attractive feature.

And now, my friends, I commenced with the evolution of the system, with the planets forming round the sun, and we have arrived at the time when the sun had become not only visible from the earth, but most active and potent on its surface ; and I should like to show you the adaptation of the one to the other. * * *

But, my friends, I cannot stand upon the brink of these attractive, illimitable, astronomical spaces, to which I have again conducted you, without diving in : I cannot quit the world without showing you, how her beautiful sisters are her ministering servants.

There are those who will tell you, that our sister planets are worlds like our own, inhabited by like existences. While I see no reason for such a belief, I see very many reasons for believing the contrary. With the talented author of the *Plurality of Worlds*, whose theory I sketch, I believe that this world is the only inhabited, inhabitable planet in the system. I cannot state at this stage of the evening the scientific grounds on which this belief is based, but I may mention one general physical law which suggests it. We have seen, my friends, the hot air and moisture of the equator driven from the neighbourhood of the sun to the poles : we see every day, when a wet towel is suspended before a fire, the vapour driven off to the cold spaces beyond : and thus I believe that the water and aqueous vapour of the original un-

formed nebular matter was driven from the sun to the outer parts of the solar system, and there bound up into planets. All that we know of Jupiter, Saturn, Uranus and Neptune encourages, if not quite demonstrates, the belief, that they are liquid masses of some sort surrounded by vapour. Even Mars, in the neighbourhood of the earth, has in part an aqueous atmosphere. But when passing the earth we approach the sun, what find we? In that moon so near us not a vestige of water! What then must we conceive the condition of Venus and Mercury? Burned up by intense heat, they are glistening, glistening, scorched masses, without any atmosphere, gaseous or aqueous, broiling, not to say, boiling worlds. The earth alone is placed at the border where the conditions of life meet in harmonious union: air and water for vegetables to drink and breathe, and all to nourish animals; with solid matter for both animal and vegetable to stand and grow upon, and in which to find the necessary solids for their solid framework; and, besides, a due supply of light and heat, and due energy of that all necessary, all prevailing law and force of gravity. "The earth's orbit is the temperate zone of the solar system. Here alone is play of hot and cold, moist and dry, possible." Here alone the due mean betwixt the fierce extremes. Here alone does life find a tempered, temperate foundation on which to stand—'twould be burned up in Venus, 'twould be drowned in Neptune! Here alone is the existence of matter in a solid, a fluid, and a gaseous form possible! And living and growing upon land, and nourished by water and air, here alone have plants and animals arisen and progressed into the endless variety, which replenishes and embellishes the unity of this beautiful world. Thus, then, earth is the true cypher expounding the riddle of this system. The waste and otherwise injurious fire and heat have been gathered into the inner planets: the waste and otherwise injurious water and cold have been gathered into the outer ones: a temperate zone has been cleared for this earth—a world into whose composition the life bearing conditions of this system have been combined; and, launched from the hand of her Creator, she has run the round of her appointed orbit, an easy, agreeable, rejoicing course, ministered to by her father, the sun, and her sisters, the planets, to all intelligent existence an object not of dumb wonder, but of high, rational, delighted admiration, finding voice and rising to God in adoring praise!

And now, my friends, I ought to introduce man upon this

world: "And God created man: in his own image created he him." I ought to exhibit man assuming the reins of government, which had dropped from the lordly tribes of brutes, and becoming the universal animal, roaming the world from pole to pole, and binding into a unity the variety of creation. But I have purposely left this whole portion of my subject for a future lecture, hoping that, some one may be found to resume, what I have been unable to complete. However, I cannot stop without linking this world, whose unity I have endeavoured to manifest, without linking this system on to the universe!

Regard those myriads of stars, which glorify the infinite of space, and say, has this world no connection with them? Are they fixed and is this system fixed? Is each confined to the little portion of immensity, which each variously and severally fills? Fixed! there is no such thing as fixity in the universe. There is a talk of fixed stars, but, believe me, it is only talk. The sun himself is in motion, not round his own axis alone or centre, but onward—onward through space! He is proved to be travelling with all his family of planets at the rate of 422,000 miles a day towards a point in the heavens near the constellation of Hercules. This is his orbit, along which he moves and bears his planets with him! He is himself but a star of a system larger than his own, revolving round a mightier centre—the centre of a universe rather than of a system, the centre of the Milky Way! For our sun is one of the stars composing the system of the Milky Way, and is situated in one of the poorer, more vacant parts of that system, which is a grand succession of clusters or little universes of 20,000 stars each, and consists entirely of orbs scattered, heaped, like glittering snowdrift, on the background of the general heavens. What a magnificent view of the creations of God's Almighty power does this present! We are no longer dealing with planets revolving round suns; but with suns bearing along each its family of planets, and revolving in myriads round some mighty centre, some unimaginable world, to which in comparison these suns are planets, these planets satellites. But we stop not here: nature knows no rest. The Milky Way is not the only universe in the heavens of space. At immeasurable distances all over the sky objects like fleecy clouds are observed, which were once supposed to be nebulous matter or the unformed vapour of stars, but are now by our improved telescopes resolved into universes, like the Milky Way, composed of unnumbered

sun in almost innumerable clusters. About 4,000 of these universes have been discovered scattered over the heavens. They too obey the laws, which this little system of our's obeys, and which are obeyed by the Milky Way—this universe of ours! And what are these universes, but, in their turn, stars or suns, revolving again, even like this simple earth and her humble sisters, even like the sun and his offspring, round some mighty centre, some mightiest of centres: and nature becomes one: and its unity as the unity of its Creator, the unity of God! Is not this a noble unity! But what can its centre be? What centre can be chosen to bind together not planets; not suns; not clusters of suns; but universes of clusters, Milky Ways; aye, the individuality, in fine, and totality of material Nature? The mind throbs and dilates with the effort of transcending conception!

Allwise Almighty! who can be thy brother,
Thy father, or thy friend; or who can give
Counsel to thee, or look on thee, and live!
Nought wastest thou no tittle of thy power,
Since thy long gone, thy first creating hour.
To thee alone thy first creation clung;
Thy next to that; on it thy third one hung.
Each thou on each still makest to depend
Throughout creation—not begun to end:
World upon world, and these upon a sun;
Systems upon each other, and on one
Or sun or system mightier than they;
Universe upon universe away
To utmost bound, if such there be of space,
And these, and all, upon that nobler place—
The centre of creation, throne of God!
Whence he beholds and rules the bright abroad,
Around him wheels it orderly and great,
And where he rears or binds the threads of fate!

Yes, my friends, heaven is not a state only, but also a place; and may not the centre of creation be that place? May not the Saviour have erected his throne there, and from the centre of his kingdom sway the whole? When the grave, which shall receive this body so fearfully and wonderfully made, shall have restored it to me spiritualized and glorified, shall I ascend thither? Or shall earth—renewed by, annealed in fire—be still my dwelling, or some other higher world; and shall I only make, as the Jews to Jerusalem, periodical pilgrimages to that holy place? And shall I dart like a ray of light from world to world, and, as it were exploring the bo-

som of my Father, range the infinite variety of his beautiful creation? And shall I inspect and thoroughly understand then those grand systems, so unlike our own, the binary, ternary and quaternary suns? And shall I visit those fairy worlds where day from day to day changes through all the colours of the rainbow, like the dying dolphin which so beautifully dies? What new wonderful elements shall I discover in those far off worlds? What new sciences shall I learn, or developments of science? How shall I rejoice in the increasing variety, and, a youngling immortal, rub joyful palms over the prospect of eternity! But shall I not rejoice above all in the ever expanding views which I shall receive of the unity of the whole!

Before I quit this subject come with me out into the night. Let us count the stars together. What numbers fill each rood of blue! How quiet they are! peaceful as the grave, beautiful as death, hushed as the last repose; yet full of life, and radiant as the faces of angels! Why do they not jar? Why do they not thunder from on high? I gaze upon them, and their spirit, as it were, descends upon me—a spirit of deep, deep peace, an ecstasy of harmony and repose! And I know, that the God who made them must be a God of peace—my God! must be a God of love as well as of peace; for he made those peaceful stars to whisper their peace to me, and that he has in store for me a higher still—peace to be felt, but passing understanding! I listen as I gaze, and I seem to hear in the recesses of my soul unutterable harmonies; as though an angel were sweeping the chords that make of creation one mighty harp, and waking for me its music! But I only seem to hear, for nature the while is hushed.

And has she then
No praiseful utterance for Jehovah's ken?
She had—she has. It is an utterance dumb,
Like that of those by feeling overcome—
The eloquence of silence. Heaven desires
No minstrelsy above her dumb hushed choirs!

The harmony and beauty, the order and majesty of those quiet wheeling and resplendent worlds! Are these then the highest praise desired of heaven? Nay, for heaven has higher praise than even such. The instinct of the noble dog, that approaches me at home, and, opening and shutting his mouth, asks for a bit of something to eat, is higher praise, than the orderly movement and magnificent display of the

most majestic world that glitters in the coronal of night. The midge, I crush, is nobler than the mountain ridge over which it cannot fly, I cannot climb. Avert then your eyes from those peacetul myriads of worlds: turn them upon the endless variety of wonderful existence, that inhabits and glorifies our globe. Behold, how fire, air, earth and water—all things minister to life! Behold how life, in turn, gives these significance—their purpose, and their end! Behold how lower life to higher still is ministrant, and infinite variety still finds its climax and its range in unity! How each on all depends, and all on each! Each being, dead or living, a purpose has, which each fulfils, instinctively or naturally obeying the will of the great Creator, whose Providence watches over and cares for each! Each is a link in a great chain of being! Each a unit of the mighty whole! And have those glittering worlds peopled planets too: what is true of earth, is true of them! I will be bound, there is no purposeless, unmeaning thing in all the universe! I will be bound there is no untended, uncared for life throughout the range of being! I will be bound throughout creation the eye of God no creature can, no creature could, no creature would behold,

Untended, unattached, or out of place—
A vagabonding blot on nature's face:

even man, the willing wanderer from love divine, is still the cared for and beloved son of heaven. Aye, manifold influences, kindly and wise, travelling over space, reticulating the circumference and the interior, the surface and the mass of the orb of creation, gather each waif of existence, vagrant, insignificant atom though it be, into the bosom, weave it into the sphere and purpose of the universe! Would that our ears might open to the oratorio of nature—the natural symphonies, that ascend from all the wide and ever active universe, whose very activity makes and is music—a diapason of harmony, which arises to and surrounds the throne of God, and fills the ear and gratulates the Spirit of Divinity; and, oh! our souls would be so ravished by the sound, that were we to hear it but for an instant, like the Peri of Moore, who

“ One morning at the gate
Of Eden stood disconsolate,
And longing listened to the springs
Of life within like music flowing,

And caught the light upon her wings
Through the half opened portal glowing,
And wept to think her recreant race
Should e'er have lost that lovely place :"

we would not be content to listen from without, but long to leap into the midst of it, to become a part of it; and would ever afterwards hate and fly discord, as the saint hates sin and flies perdition.

But is it so indeed? would our souls be really so ravished? Alas, I forget the full depth of our terrible fall! Yes, we require even a higher exhibition of harmony, than is this, to lure us out of discord; or, rather, we require to see this harmony embodied in the man Christ Jesus, Immanuel, God with us. But let the world open its eyes to the love of God in Christ, and, then, farewell discord! welcome peace and joy! Man shall then love man! America shall be no more America; nor Africa Africa; nor Europe Europe; nor Asia Asia;—they shall all be one! Then shall humanity fully comprehend, what our Saviour meant when he said—"Love is the fulfilling of the law." Yes, for it binds man to man, unites the creature to the creator, and restores to its pristine music the disturbed harmony of the universe—restores to his adoring position amidst the worshipping bands of creation man, who now unites with devils to be

"The curse and menace of the universe!—"

Man, who, if he continue still impenitent, shall yet add his wail and groan to the wail and groan of the lost angels in that hell, which the rejected love and necessary justice of Jehovah shall then, as ever, harmonize with the music of existence, making it now the deep thundering bass, and now the shrill, piercing treble of the choir of being ceaselessly, untiringly, exultingly singing that all inclusive, all inspiring oratorio, known on earth as the wisdom, power, holiness, justice, goodness, and truth of God!